

BIGLOW (P.)

How to make a City Cholera proof

THE COSMOPOLITAN

AN ILLUSTRATED MONTHLY MAGAZINE

AUGUST, 1893

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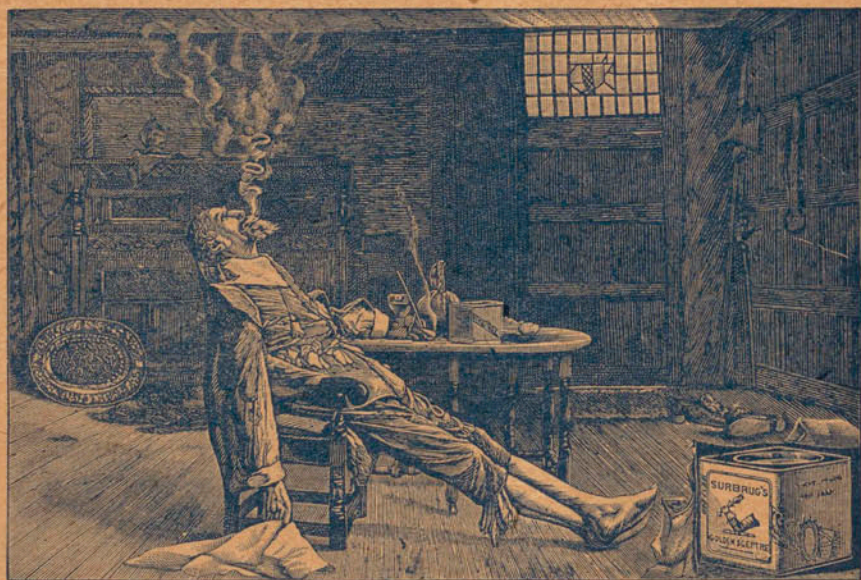
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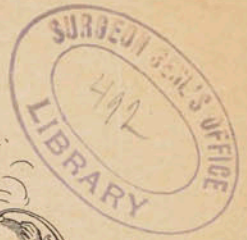


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BY POULTNEY BIGELOW.

IN the summer of 1887 I had the good fortune to be taken over the great sewage farms which lie at a distance of about six miles from Berlin. I was accompanied by the bacteriologist, Dr. Koch, who, in the course of conversation, let fall the remark that, in his opinion, Berlin was proof against an epidemic, owing to the manner in which her sewage was carried away and rendered innocuous. These words, coming from such a man, were so striking that, on reaching home, I put on paper, in the form of notes, the result of my day's experience, curious as to how far this prophecy of the learned doctor would be borne out.

The great cholera epidemic came and paralyzed the commerce of most of the seaport towns of Europe, devastated Russia pitilessly, and left the great city of Hamburg more impoverished than when the troops of Napoleon evacuated it.

Berlin, looked upon the progress of the plague with equanimity, although she is on the highway between Hamburg and Russia, and daily exposed to an attack, because she lies upon a river connected, by means of canal, not only with the waters of Hamburg and Russia, but of an infected port on the Baltic, Stettin. Her hospitals accepted, as a matter of course, the isolated cases of cholera that occurred in her neighborhood, but there was, at no time, anything approaching to an epidemic within her walls. Travellers passing, as I did, during the height of the cholera scare were not annoyed in any way; in fact, the life of the city was perfectly normal, and thus the words of Dr. Koch have been justified.

Berlin has solved the question: how to make cities healthy. She has called to her

assistance men of scientific attainments and administrative experience. The political vagrants that barnacle themselves upon every department of our municipal administration, from the health department to the primary schools, are a class unknown in Berlin; and the idea that a citizen must be paid for acting as a municipal official, has not yet taken root there.

The experiment made by Berlin in utilizing her sewage by making it enrich the sandy soil of the neighborhood has proved so successful, is so simple, so inexpensive, and so well suited to the needs of New York, that a few words of description may not prove uninteresting. And if we bear in mind that within a few miles of our City Hall are thousands of acres of sand, only waiting for proper manuring before blossoming into high fertility, it will be readily appreciated that any method that will not only accomplish this result and purify our city, but lighten the burden of our taxes at the same time, deserves study.

The present system of cleansing Berlin has been tested by nearly twenty years of thorough experience. It was introduced in the face of governmental opposition and the more bitter antagonism of those living in the neighborhood of fields likely to be inundated with city sewage. During these years, the affairs of the department have been managed by gentlemen of the highest respectability, with the strictest economy, and with a view to gathering the most valuable scientific data from this novel experiment.

I will try to explain, briefly, the process.

Berlin, for scavenging purposes, is divided into districts, each of which is under a competent head, who is responsible for

the working of the system within his limits. A huge cesspool in each collects all the sewage in that particular district, and this sewage, by means of powerful engines, is uninterruptedly pumped off, far out of the city, on to land specially prepared for this purpose. Difficulties, in matters of detail, have been met and overcome, and by a careful system of observation it has been learned how to meet sudden overflows, to adapt the number of pumps to the work required, and to arrange for reserve power, in case of emergencies.

Let us take a look at one of the great sewage farms, Blankenburg, for instance, half-a-dozen miles north of Berlin.

This farm I visited through the courtesy of the chairman of the municipal committee on sewage, Herr Stadtrath Marggraff, a gentleman who receives no salary for filling a position which demands the most active employment of nearly his whole time. I need only add that, in Berlin, his name was mentioned to me, in the best quarters, as being synonymous with efficiency and public spirit.

After a short railway ride, we dismounted at the station Blankenburg, immediately adjoining this great sewage farm of about 2700 acres. The road along which we walked was deep with sand. On either side of us, however, were fields, rich with a most luxurious growth—fields which, but for the irrigation to which they are subjected, would be as fruitless as the road on which we walked.

I noted magnificent artichokes, tomatoes, lilies of the valley, violets, apples, pears, gooseberries, roses, beets, in short, every variety of flower, fruit and vegetable, growing upon soil which, ten years ago, would hardly hold the coarsest shrubs.

The various sewage farms surrounding Berlin, have under irrigation so far about 13,000 acres. The city is, however, acquiring more land for this purpose, as funds become available, and for some years to come we may expect an annual addition to the irrigated system.

There were, in the official year 1885, some 10,000 acres under irrigation, for a variety of purposes, including experimental agricultural purposes, nurseries and flower-raising. The staple crops, however, were summer and winter rape, mus-

tard, hemp, winter and summer wheat, winter and summer rye, oats, Indian corn, barley, buckwheat, peas, beans, clover, grasses, potatoes, beets, cabbage, chicory and turnips. Cereals alone took up nearly 4000 acres.

In its original condition, that is to say, before the city of Berlin adopted the present method of cleansing itself, this land was worth \$182 per acre. As soon, however, as sewage is applied to it, the value rises to over \$400 per acre.

In order to realize what a great work Berlin has accomplished, not merely for the cleanliness and health of the city, but also for the benefit of the surrounding country, and the reduction of taxes, we must bear in mind that her position is in the center of a vast sandy plain, diversified by morass and swamp. The dreariest stretches of sandy Long Island are picturesque, if not luxuriant, in comparison with the country about the German capital. Yet on this soil are now being raised crops that would astonish an Iowa state fair. I was told that, on some fields that we passed, seven crops of grass had been cut in one year, off of one piece of land, two acres having yielded alone twenty-five tons. And this grass is of a most excellent quality, as is attested by all the farmers of the neighborhood, who seek to get it for their cows.

One field contained eighty-one acres of mangelwurzel alone, and we had an opportunity of proving effectively that the stuff raised was of the best quality.

At intervals we would pass men loading their carts from adjacent fields, and found, in talking with them, that they had rented irrigated fields from the city and were doing a thriving business.

Learned lights of the German scientific world had gravely told their hearers that for one year, two years, possibly three years, the system might work; but that the time must speedily be when the soil would contain so much sewage matter as to not only make vegetable growth impossible, but to poison the air and water of the whole surrounding country. The bulk of Berlin believed firmly that the adoption of the present system of disposing of sewage was one calculated to simply remove the poisonous matter from within the city to a belt encircling the city. The danger thereby, it was thought, would be

in nowise diminished, for they looked upon the system as one calculated to surround them with a cordon of poisonous outposts, whose pestilential powers could act against them with every breeze.

The managers of the sewage farms have found that they have no difficulty at all in adapting their crops to the strength of the soil at their command. In other words, they can exhaust as fast as the city can restore.

Another great source of alarm was lest the drainage from the irrigated fields should poison the waters of the neighborhood. So serious was this feeling among all classes, that a law was passed, making it punishable, by a fine, for anyone to drink from the waterways near any of the sewage farms. Mr. George von Bunsen, who has taken great interest in the encouragement of this work, told me a characteristic anecdote in this connection.

The head of the sewage farms, when this law was in operation, was Dr. Falk, who had made exhaustive experiments with the water from these fields, and was thoroughly convinced of its purity.

One day, Mr. von Bunsen, with a committee of the German parliament, were making an inspection of the fields with the doctor, and took the occasion to ask how it was possible to prevent the peasants of the neighborhood from breaking the law by taking a drink now and then from the ditches. The committee were all convinced that the water was deadly; the sign-posts all warned people to have nothing to do with it, and yet it did look clean and might prove a great temptation.

Said Dr. Falk: "I am at the head of this institution in two capacities. As magistrate, it is my duty to punish, by a fine of three marks (seventy-five cents), anyone convicted of drinking of this water. As physician, however, I give you my word that you may drink it without the least danger to your health—in fact, it is purer than what you have on your tables in Berlin."

The parliamentary deputation were incredulous. They at first treated the doctor's statement as meant for a joke; but, finding that nothing was further from his thoughts, one after the other took a drink from the ditch near which they were standing, and thus forever disposed of an absurd piece of superstition.

Dr. Koch, the authority on bacilli and disease-germs, told us, on the spot, that before disease-germs could propagate themselves in Berlin, they were hurried off on to this soil, which is completely destructive to bacilli. The six hours that intervene between bacilli entering the drains of a Berlin house and reaching the ditches of the sewage fields, are not enough to give the disease a start.

Nevertheless, such was my prejudice that, when an attendant offered me a glass full of the sewage water that passed at my feet, I think I should have declined, could I have done so with any fair pretext.

The water offered me in this case had entered the sewers of Berlin only six hours before. The only cleaning it had received was in percolating from the irrigated field into the ditch that surrounded it. So effective, however, is this, that my drink was not only as clear as pure spring-water, but the taste was as though it had been distilled—a taste familiar on shipboard. And not only was this water free from odor, but the air, on and about the irrigated fields, was not tainted to a point that could be called offensive. At the moment of flooding a field, the odor would be as strong as on any field freshly manured in the usual manner.

The sewage is so largely cleansed by the mere passage through six miles of pipe, that, after it has been a short time upon a field, the odor is hardly noticeable. The complaints from neighboring farmers, which at first threatened to wreck the enterprise, have quite ceased.

The effect upon the stranger who, after driving for miles through sand, comes suddenly upon a garden fertile beyond anything known to the most favored soil, is startling. He cannot realize that what he sees is genuine and, of course, suspects some baneful property to attach to these plants. The Berlin marketers, at first, would not touch them, because their customers declined them in horror. Today, so great is the demand for "sewage vegetables" that the market people are clamoring to have a special section reserved for this growth alone, alleging that, in that way, they can get higher prices for these particular vegetables. The revolution in public sentiment, on this subject, has been complete, and today no industry in the empire is more secure than that of

renting sewage-irrigated fields from the city of Berlin, and raising thereon, truck for the market.

Does the method of disposing of sewage pay? This is the question that will interest the tax-payer. We can answer emphatically, yes—it pays in the most handsome manner—at least it pays the Berlin citizen well, and there is no reason why we should not derive equal benefit from it.*

When I first knew Berlin, before and during the war of 1870-71, the sewage went into the open gutters, and was swept along by gangs of men, with a resulting smell of the most offensive kind. So flat is the city, that the water did not flow off itself. This system, primitive and disgusting as it was, had, it was thought, the merit of cheapness.

Quite the contrary.

The city spent more upon its street-sweepers of that day than upon the finished machinery now at work. The sewage of 1870 went into the sluggish streams of the neighborhood, to poison the fish and benefit no one—just as with us in New York. Today, the Berliners earn a pretty penny by turning farmers and saving their manure.

If the present system of sewage costs Berlin no more than in 1870, they would be immensely the gainers in these points.

- 1.—They have no smells in their streets.
- 2.—They are not poisoning their waterways.
- 3.—They are insured against infectious disease.

All this achieved with no additional outlay to the tax-payer; but, on the contrary, at a profit of two per cent. upon the capital invested. This is the financial result of Berlin's sewage operations.

Perhaps a few figures will illustrate how this comes about—figures too simple to puzzle the most unstatistical.

For the twelve months between March 1885, and April 1886, the cost of cultivating 9194 acres, was \$134,778, while the income from the same was about \$271,000, being a profit of over \$136,000, or about \$32.50 for each acre. This profit is calcu-

lated without reference to the general and official expenses, and interest on capital. Counting, however, all possible charges, the profit still amounts to an average of \$18.50 to the acre.

The director of this great system of sewage farms receives \$2000 a year, not too high a salary, we must admit, when we reflect upon the scientific attainments such a man must possess, his administrative ability and business experience.

Last year's expenses for salaries and expenses, covering all the sewage farms, amounted, on an average, to only \$2.65 per acre. The expenses under the head of taxes and charges were \$11,795, less than ninety cents an acre.

Maintaining the various farm buildings costs one and twenty-four hundredths of their estimated value, including their insurance. The value of all house furniture, agricultural machinery, and implements, represented about \$16,000, or \$1.28 to the acre.

The cost of keeping all roads and ditches in order was about forty cents to the acre.

Adding in all the miscellaneous expenses, the grand total for the year, under the head of general expenses, reaches only \$78,364.67, or \$5.90 an acre for each of the 11,769 acres that were "be-sewaged" that year.

Stock-raising is a most valuable part of the Berlin farms, as well as receiving horses that require rest and pasture. The value of their grass may be appreciated, when we learn that ninety-two fields sown with grass, representing 524 acres, produced together 231,308.50 centners.* Some of these fields were sown six times in the year.

A large source of revenue may be expected from renting irrigated fields for truck purposes, also orchards. The Berlin farms have now over 100,000 fruit trees where, twenty years ago, nothing of the kind would grow, and each year sees an increase. If, by simple irrigation of this kind, we can convert a sandy desert into grass meadow that will yield seven crops in one season, as at Blankenburg, it is fair to think that any corporation

* The report of 1886-87, just issued (Jan. 1888), states that the profit upon each of their cultivated hectares was fifty-eight marks (\$14.5), equivalent to about \$6.00 per acre.

All the land acquired by Berlin for irrigating purposes (16,457 acres) was purchased in the same manner that it would have been had it been needed for railway purposes. This area, all within ten miles of Berlin, cost the municipality about \$4,092,177. Note also that this land when irrigated, is let to truck gardeners at (about \$20 to the acre).

* One centner = 123.472 pounds.

that undertakes such an enterprise in earnest will not lose money.*

Last year it was found that upon a farm of 1356 acres, irrigated by sewage, the whole cost of preparing, sowing, cultivating, harvesting and irrigating seventeen different crops amounted to only seventeen dollars an acre.†

We all know that more danger to the public health arises from the sewers than from any other cause, and that, therefore, scavenging, as a profession, must be a dangerous one. But the system under which Berlin purifies herself is happily freed from the ill effects attending all others.

The several estates, making up the total area of the sewage farms, were supporting last year 33,749 souls. Out of this number there were 237 cases of illness, the causes of which are interesting to note.

The figures, in themselves, are uninteresting, their value being purely negative. It cannot be demonstrated by them that residence upon a sewage farm is more healthy than elsewhere. But, on the other hand, it will be seen that, so far as health is concerned, one is no worse off upon a sewage farm than in any other community. This fact alone is well worth bearing in mind, for it took twenty years in Berlin to overcome the prejudice entertained against this sewage system by people who predicted that it would result in breeding pestilence all around the city.

To apply the lesson of Berlin to our requirements, it would be necessary:

First—To acquire enough land between Whitestone and Coney island to enable the city to lay out fields, suitable for irrigation, and enough of them to meet the anticipated increase in the population.

Secondly—The sewage of New York island, instead of being turned into the surrounding waters, would then be collected at a dozen points, on the east side of the town, between the Harlem and the Battery.

Thirdly—From these points of reception it would be pumped off, night and day, by means of powerful engines, through suitable pipes, out on to the city farms. None of these farms need be more than ten miles from its particular pumping station. One pipe-line, for instance, might lead from the foot of Fulton street out in the Flatbush direction. Another, from the foot of Tenth street, could work the Jamaica neighborhood. Several pipe-lines could cross the East river at Blackwell's island, and enrich the Flushing neighborhood, which now pays such heavy taxes for manure.

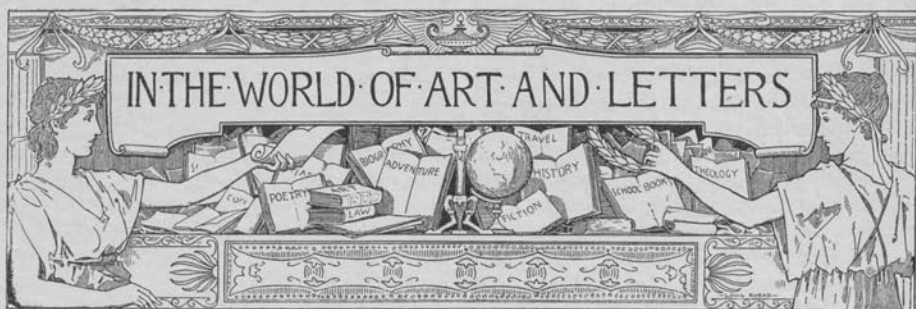
A scheme of this kind, faithfully carried out, would make of Kings and Queens counties a very paradise of fruits, flowers and vegetables. The dreary sand wastes of today would give place to well-kept gardens, managed by happy tenants of the city, who would be glad to take, on long lease, land irrigated in this manner. Real estate would immediately rise to a solid value, in places where, today, it is worth nothing, save on the hazy possibility of its one day being a resort of summer boarders. Brooklyn and Williamsburg, it is reasonable to think, would heartily coöperate in the undertaking, for their interest in the matter is, if possible, more pronounced than that of their sister across the bridge.

We can all appreciate the value of a system that cleans our streets, makes sandy soil grow luxuriant vegetables, and raises the value of real estate. What we shall get, better than all these, however, is such a thorough scavenging system as shall make us hear of yellow fever and cholera, on board incoming ships, without alarm.

We shall be able to feel that any contagious disease, entering our gates, meets, at the threshold, an enemy to its progress so watchful and aggressive that its further spread is, humanly speaking, impossible.

* For the fiscal year 1886-87, the irrigating works of Berlin carried off the refuse of 17,645 houses. This would indicate, according to the last census (1885), which gives one house to sixty-five inhabitants, that the present facilities could provide for a population of 1,146,925, a fraction over a million.

† In calculating the relative cost of irrigating from Berlin and New York, the difference in wages is, of course, an important factor. The last report of the Berlin Sewage Commission (1886-87) gives the following as the wages paid there: Engine drivers, \$1 to \$1.25 a day, sometimes as high as \$1.50; irrigation inspectors, fifty to sixty-two and one-half cents for a day's work of twelve hours; day laborers, men, forty-three to fifty-seven cents; day laborers, women, fifteen to twenty cents; children, seven and one-half to twelve and one-half cents. At harvest-time the wages are raised thirty-three and one-third per cent. There was paid out in wages, to last year's workmen, upon the 4166 hectares under cultivation, around Berlin, \$27,357.5, about \$2.67 to the acre.



THE COSMOPOLITAN asks me to say a few words in each number upon the most important event of the month. For once, at least, I confess that I am greatly embarrassed. What event, during this first half of June, has most attracted the attention of Paris? It would take a clever man to answer this question. With us, one event crowds upon another, and no single one holds captive for any length of time the frivolous and vagabond mind of the Parisian. Alfred de Musset, alluding to the death of Malibran, a fortnight after she had passed away, declined to say anything in public, adding, with a touch of sadness that, in Paris, two weeks "make of a recent death an old story." I fear that my comments, reaching you after the telegraph has robbed the news of its freshness, may seem to you "warmed over," as we say in France. Nevertheless, I risk a word, counting upon the indulgence of the American public.

In the department of letters and the drama, the only one with which I am concerned, two events have produced a marked sensation in Paris. The first is the publication of a new volume of Victor Hugo: "Toute la Lyre;" the second is the departure of the Comédie Française for London.

It will perhaps astonish you to learn that Victor Hugo, who died some years ago, should thus continue to give a new work to the public every summer; and your surprise would be natural enough. But you will be still more astonished when you learn that this volume is not to be the last; that from the closet into which Victor Hugo threw his manuscripts pell-mell will come for years yet volumes of verse or of prose. These are odds and ends, but the odds and ends of a giant.

You know how pianists, in order to keep their fingers in condition, practice every day upon their instrument, going over and over their scales and exercises, like the enthusiastic fencer who thrusts at a wall to keep his wrist supple. Well, this was the case with Victor Hugo. Every morning in his Isle of Guernsey, before or after breakfast, he took a walk along the shore of the resounding sea, and, to keep his hand in, he improvised, as he went, hundreds of lines: these were his scales.

Some of these verses he thought well of, and inserted them at once in the collection published during his lifetime. Others were not so satisfactory; he did not consign them to the flames, for he was reluctant to destroy any work of his hand; he simply threw them into his closet, whence his heirs recover them today.

Think how much he must have written during the long years of his exile, when, solitary and without occupation, writing was his only resource. So when we think there is no more, there is still some left. A satirical journal has greatly amused us in Paris by its enumeration of the catastrophes which, one after the other, befall our poor Europe: a war with Germany, a socialistic revolution; and at the end of each couplet recurs the refrain:

"And a new volume of Victor Hugo appeared."

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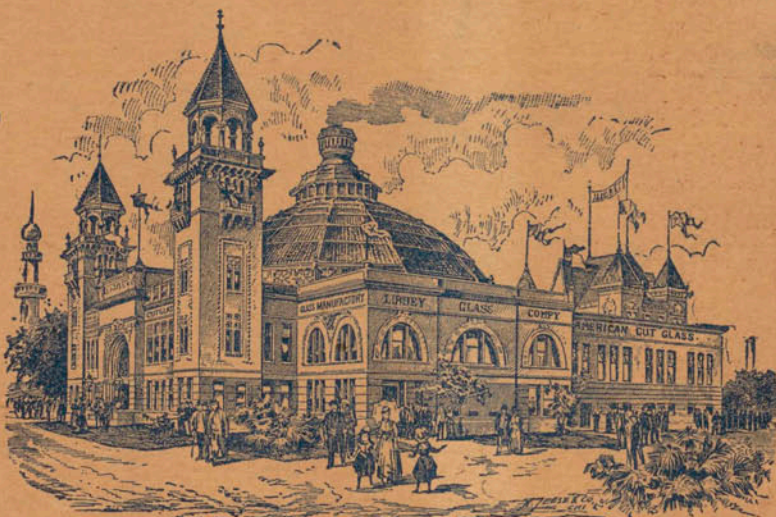
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